



# Radiological Release at WIPP: Update on Activities & Impacts

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for the U.S. Department of Energy's NNSA

**February 14, 2014:**

First Continuous Air Monitor (CAM) alarmed at 11:14 P.M.



**WIPP operations had been suspended since the February 5<sup>th</sup> underground fire.**

# What is TRU waste?

# TRANSURANIC WASTE

92 U 238.0 Uranium	93 Np [237] Neptunium	94 Pu [244] Plutonium	95 Am [243] Americium	96 Cm [247] Curium
97 Bk [247] Berkelium	98 Cf [251] Californium	99 Es [252] Einsteinium	100 Fm [257] Fermium	101 Md [258] Mendelevium
102 No [259] Nobelium	103 Lr [262] Lawrencium	104 Rf [261] Rutherfordium	105 Db [262] Dubnium	106 Sg [266] Seaborgium
107 Bh [264] Bohrium	108 Hs [277] Hassium	109 Mt [268] Meitnerium	110 Ds [271] Darmstadtium	111 Rg [272] Roentgenium

At LANL, TRU waste consists of clothing, protective shoe covers, tools, wiping rags, mops, filters, gloves, soils, laboratory equipment, residues, or liquids contaminated with radioactive material—mostly plutonium.

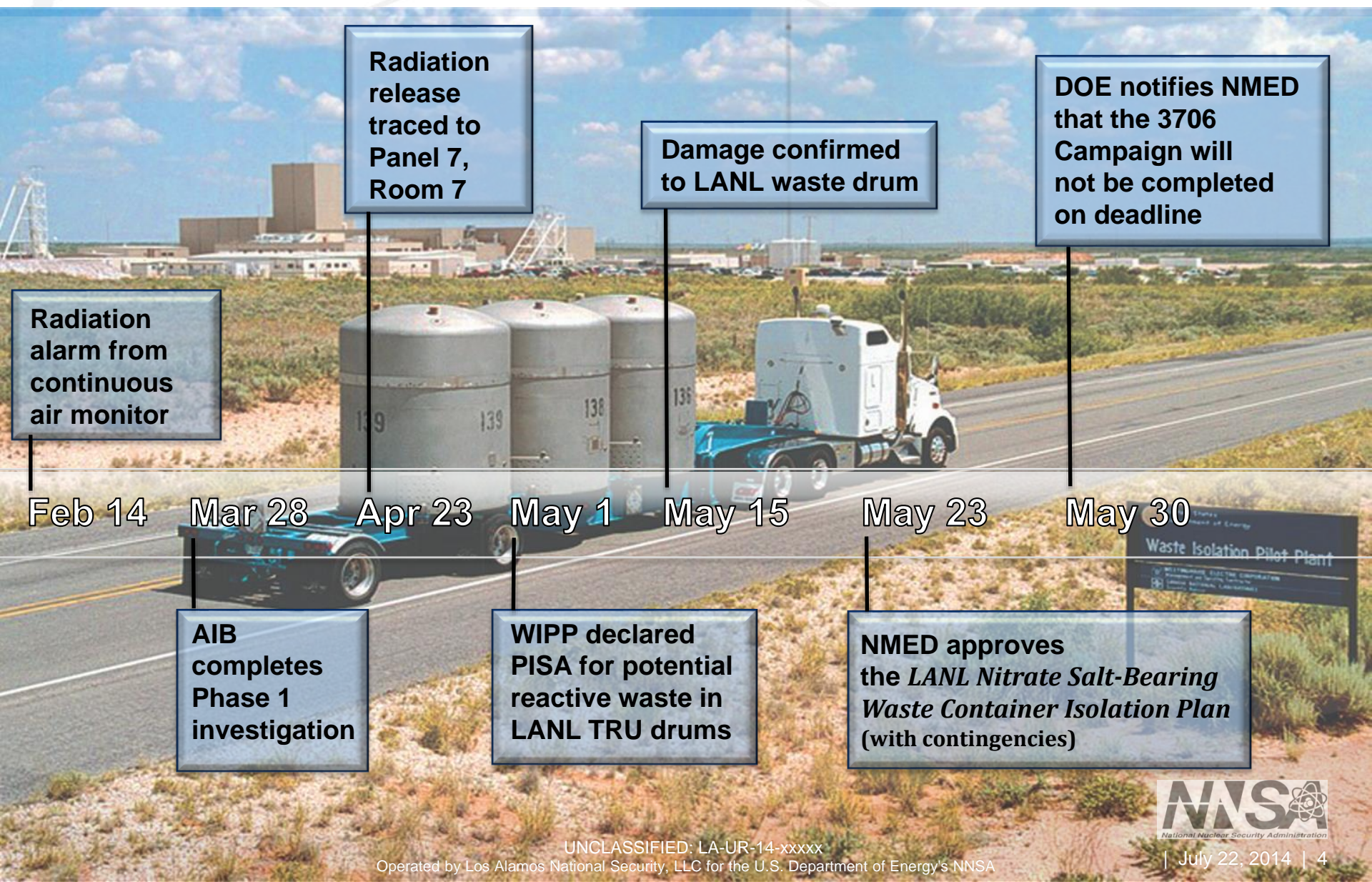
The vast majority of LANL's TRU waste is "legacy" waste created before 1991, during decades of nuclear research and production.



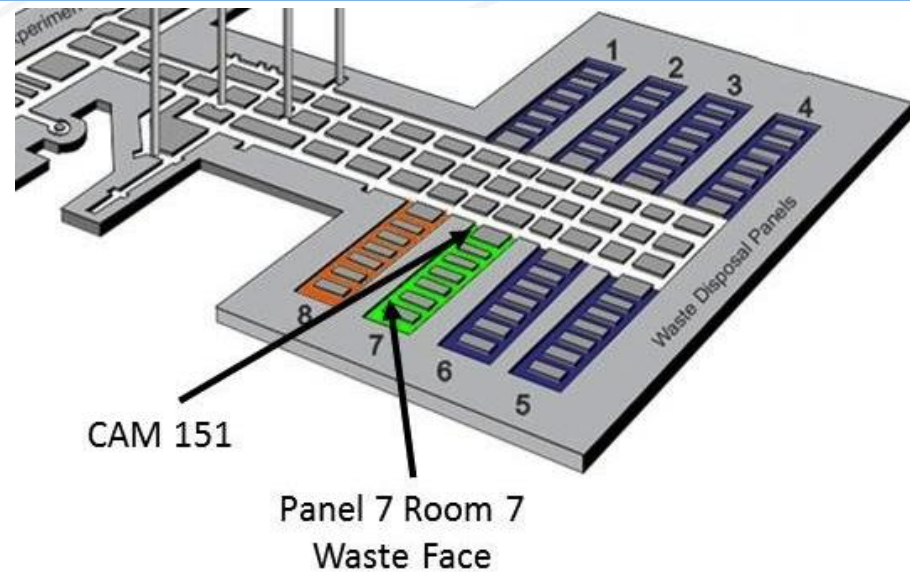
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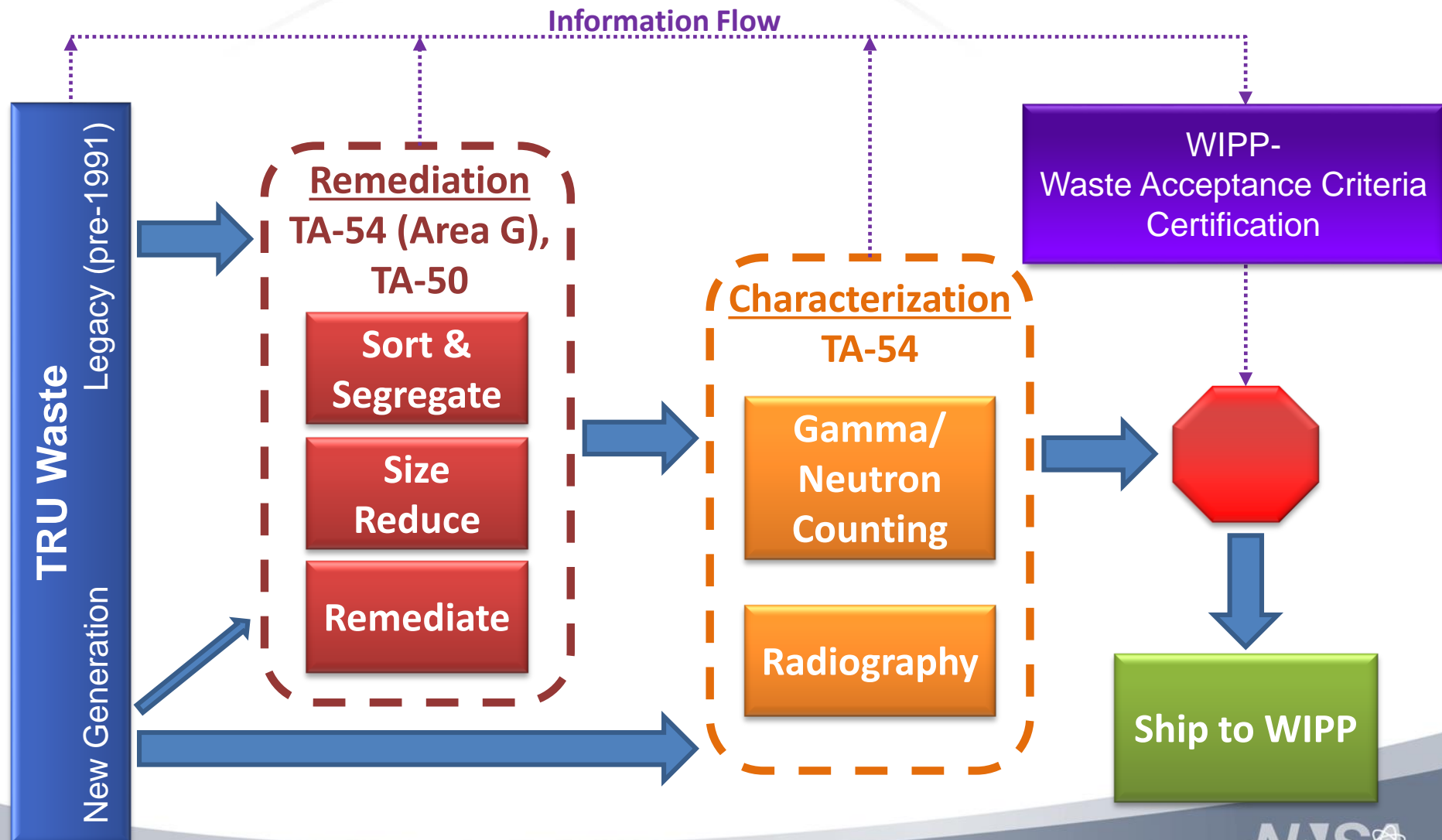
# Timeline



# A look inside Panel 7, Room 7



# Simplified TRU Waste Process Flow at LANL



# Managing TRU Waste at Los Alamos

## TA-55

What was the waste?



## WCRR

How was it processed?



## AREA G

Did it meet WIPP-WAC?



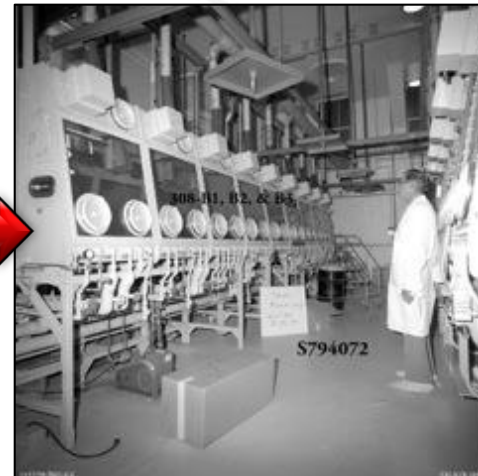
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# The History of Drum 68660



Waste generated at LANL in 1985 to  
purify weapons-grade plutonium for  
Rocky Flats mission



Parent drum initially  
packed at TA-55 and  
contained 14 items

Remediation in  
Evaporator



Two daughter drums packaged  
in December 2013

Real Time Radiography  
of Drum 68660



68660 to WIPP and placed in  
Panel 7, Room 7, before Feb 5 fire



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# LANL Actions & Ongoing Activities

Suspended LANL shipments to WCS (Waste Control Specialists in Andrews, TX).

Evaluated remaining waste inventory at LANL and WCS. Remediated by moving nitrate salt wastes into standard waste boxes/concrete casks and then into structures with fire suppression and controlled ventilation.

Responded to New Mexico Environment Department's Administrative Order.

Participating in Accident Investigation Board review.

Coordinating multi-Lab Technical Analysis Team. Secured samples of interest with tamper-indicating devices.

Sent LANL's 3706 Program Director to WIPP as liaison.

Chartered internal investigation to identify potential compliance issues with DOE contract requirements, hazardous waste regulatory requirements, and DOE nuclear safety requirements.

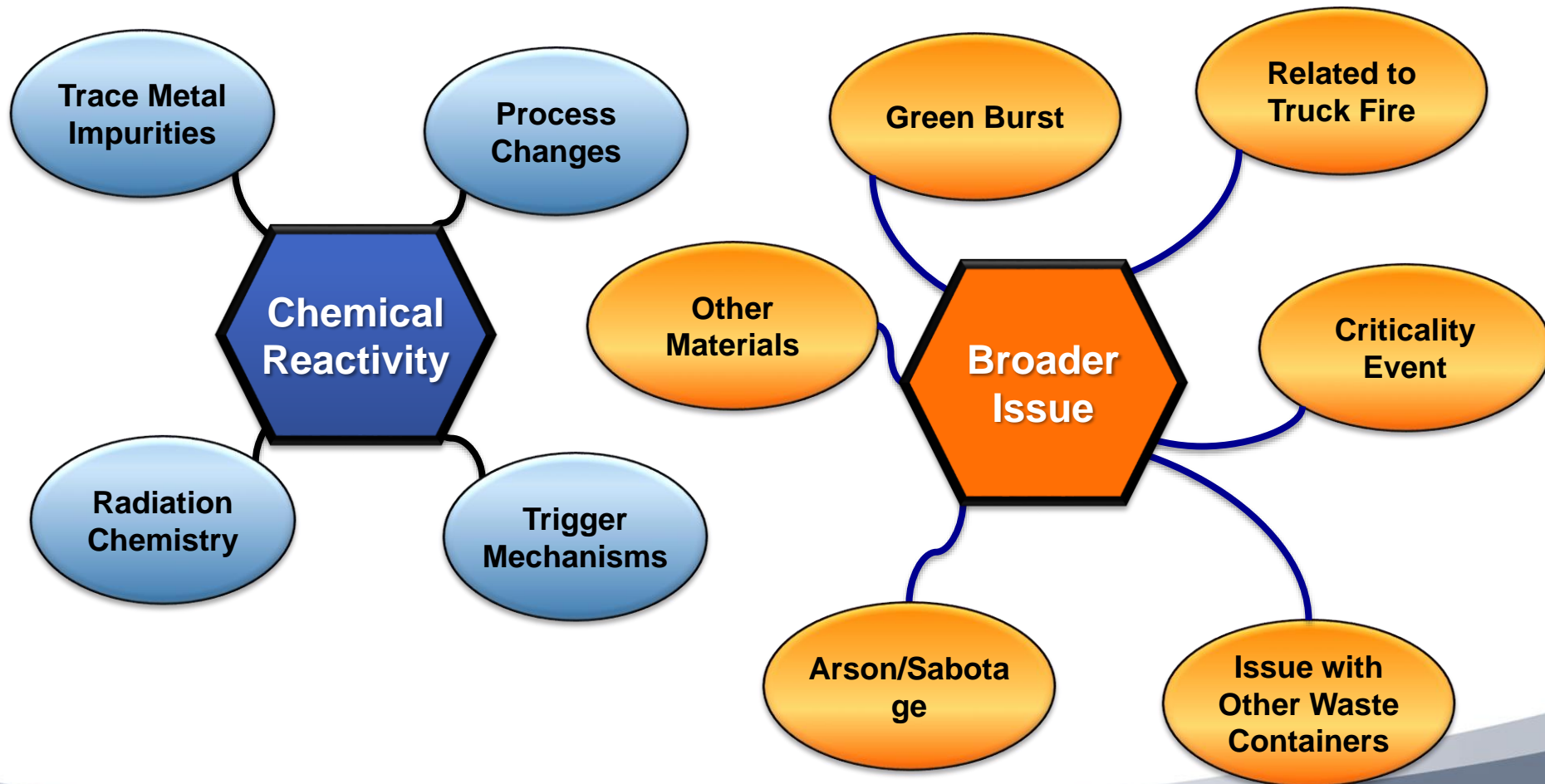
Designated Dr. Terry Wallace as WIPP Recovery Manager:

- 1) ensure we are safe and secure in ALL TRU waste operations;
- 2) understand the processes and packaging environment that contributed to the uncertainties surrounding the WIPP event; and
- 3) confirm that processing, packing, and shipping are integrated in a manner that ensures the safety, security, and integrity of the management of our waste streams.



# What caused Drum 68660 to breach?

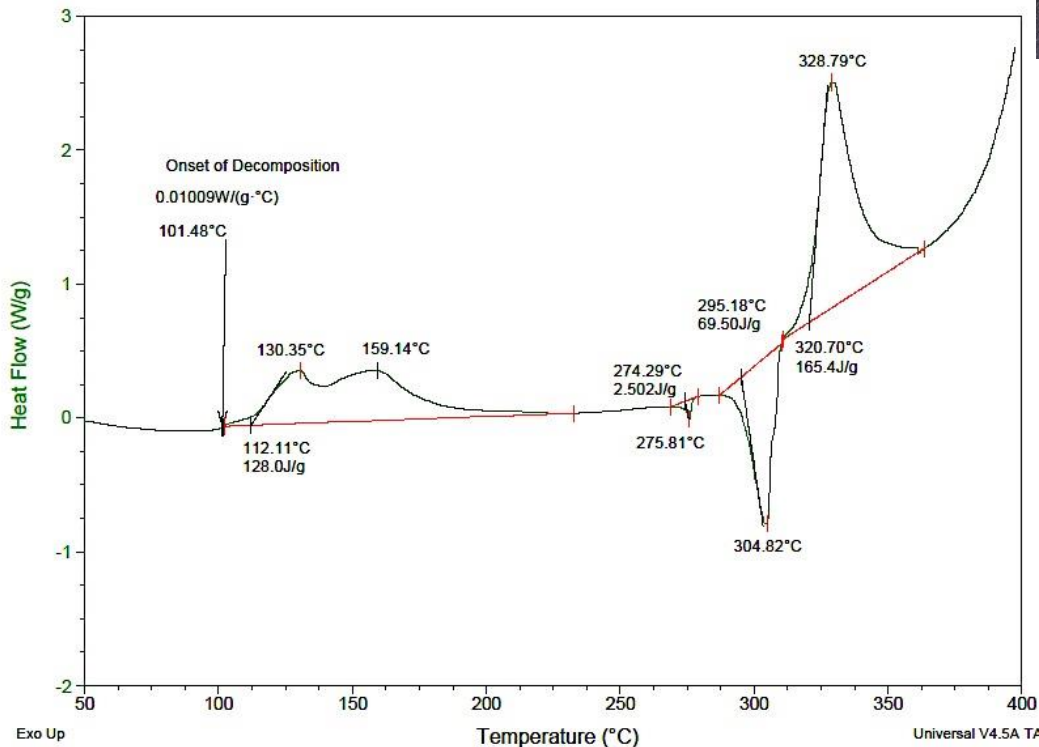
Two hypotheses considered in this complex investigation



# Investigating and characterizing the unique chemistry of 68660

## Materials

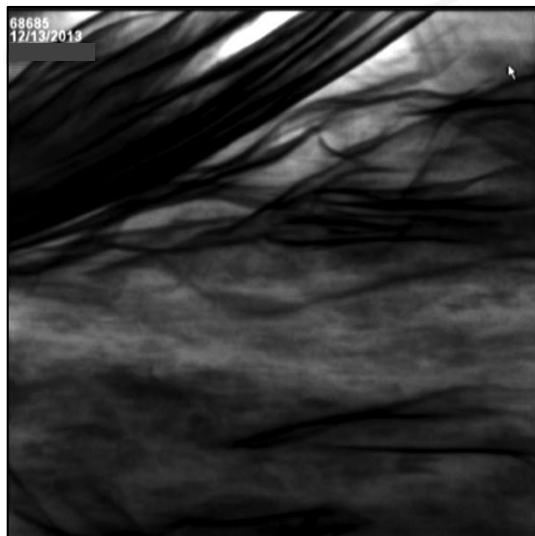
Swheat kitty litter, lead, tungsten-lined gloves, neutralizers, acid, nitrate salts



## Experimental Analysis

- Energetic properties of Swheat/nitrate mixtures
- Thermal behavior
- Accelerated Rate Calorimetry
- Decomposition and reactive byproducts
- Evolved gases characterization

# Risk and Safety



**Liquids**  
**Low pH (<2.0)**  
**Metals**



	Name	Type	Dates Used
Acid Neutralizer	Spilfyter Kolorsafe Acid Neutralizer - Liquid Formula	Acid	Exclusively after Sep 2013
	Chemtex Acid Neutralizer - Dry Formula	Acid	Prior to Sep 2013
Base Neutralizer	Pig Base Encapsulating Neutralizer - Dry Formula	Base	Exclusively after April 2013
	Spilfyter Kolorsafe Benchtop Kits	Base	Used prior to April 2013

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# Did our management systems, procedures, and practices contribute to the incident?

## Roles & Responsibilities

Did everyone have a clear understanding of the roles of the myriad participants—internal and external to the Lab? Were authorities clearly identified?

## Procedures

Did we have configuration control over changes to the baseline?  
Were changes clearly communicated to all participants?

## Orders, Regulations, Policies, Contract, Consent Order

Did we comply with applicable requirements and direction?

## Practices

Were our practices dependent on personnel, schedules, different interpretations of requirements, or other variables?

## Integration

Did we manage operations as “one Lab?”

# Priorities Today

**DETERMINE**  
what happened

**ENSURE**  
that the entire TRU  
waste stream is safe

**RESTORE**  
WIPP and  
resume national  
operations there

**PROTECT**  
the public and  
the environment